

Electrolytic Intensity

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in the order in which I have placed them, those which are first being decomposed by the current of lowest intensity. These currents were always from a single pair of plates, and may be considered as elementary *voltaic forces*.

Iodide of potassium (solution).

Chloride of silver (fused).

Protochloride of tin (fused).

Chloride of lead (fused).

Iodide of lead (fused).

Muriatic acid (solution).

Water, acidulated with sulphuric acid.

648. It is essential that, in all endeavours to obtain the relative electrolytic intensity necessary for the decomposition of different bodies, attention should be paid to the nature of the electrodes and the other bodies present which may favour secondary actions (721). If in electro-decomposition one of the elements separated has an affinity for the electrode, or for bodies present in the surrounding fluid, then the affinity resisting decomposition is in part balanced by such power, and the true place of the electrolyte in a table of the above kind is not obtained: thus, chlorine combines with a positive platina electrode freely, but iodine scarcely at all, and therefore I believe it is that the fused chlorides stand first in the preceding table. Again, if in the decomposition of water not merely sulphuric but also a little nitric acid be present, then the water is more freely decomposed, for the hydrogen at the *cathode* is not ultimately expelled, but finds oxygen in the nitric acid, with which it can combine to produce a secondary result; the affinities opposing decomposition are in this way diminished, and the elements of the water can then be separated by a current of lower intensity.

649. Advantage may be taken of this principle to interpolate more minute degrees into the scale of initial intensities already referred to (644, 646) than is there spoken of; for by combining the force of a current *constant* in its intensity, with the use of electrodes consisting of matter, having more or less affinity for the elements evolved from the decomposing electrolyte, various intermediate degrees may be obtained.

650. Returning to the consideration of the source of electricity (613, etc.),, there is another proof of the most perfect kind that

metallic contact has nothing to do with the -
production ^of
electricity in the voltaic circuit, and further, that
electricity